IOP ALGORITHM WORKSHOP, Ocean Optics XIX, 3-4 Oct 2008, Barga, Italy

Questions to be answered:

(1) SA algorithms typically predefine a series of spectral shapes for the IOP products of interest, which are described through spectral basis vectors and related constants (e.g., S, η, and $a_\phi^*(\lambda)$).

- What are the key components?
- What are the relative sensitivities and uncertainties associated with each component?
- Are certain components more critical than others?
- Given that most SA algorithms use similar components, is there consensus amongst community members as to the best definitions to adopt (on global scales)?
- Can the quality of one component be sacrificed to improve the quality of the others?

(2) What is the optimization or inversion method used?

- How critical is the choice of inversion method (can others be used)?
- What are the sensitivities of the available inversion methods?
- Does the reliability of the methods vary based on location or trophic level?

(3) Most existing and upcoming ocean color sensors (e.g., SeaWiFS, MODIS, MERIS, VIIRS, etc.) have limited band suites (5 to 8 wavelengths between 400 and 700-nm).

- What is the minimum spectral information required to effect a retrieval?
- Do wavelength requirements vary by trophic level or bioregime?
- Can additional spectral information be utilized, and does its performance improve?
- Does ignoring troublesome bands (e.g., 412-nm affected by absorbing aerosols) improve retrievals?

(4) What mechanisms are available to identify varying trophic levels or bioregimes and can parameterizations effectively switch from one bioregime to another?

(5) How do the algorithms perform relative to NOMAD IOPs using NOMAD $R_{rs}(\lambda)$?

- When stratified by trophic level or bioregime (e.g., sorted by C_a)?
- What are the failure conditions?

(6) How do the algorithms perform relative to NOMAD IOPs using satellite $R_{rs}(\lambda)$ (from a match-up set)?

- When stratified by trophic level or bioregime (e.g., sorted by C_a)?
- What are the failure conditions?

(7) How do the algorithms perform on various satellite Level-2 scenes?

- When applied to various bioregimes?
- What are the retrieval failure rates? Relative to other algorithms?
- What are the failure conditions?
- What are the remediations to failure (e.g., ignoring negative $R_{rs}(\lambda)$)?

(8) How do the algorithms perform globally, processed from Level-2 $R_{rs}(\lambda)$?

(9) How do the algorithms perform globally, processed from Level-3 $R_{rs}(\lambda)$?

(10) Given lessons learned from questions #1 – 9 …

- What are the effective IOP dynamic ranges of each algorithm?
- Can failure conditions in one product be predicted using another (e.g., poor C_a with high $a(\lambda)$)?
- Can a particular set of parameterizations be realized to minimize global satellite inversion failures?
- Are there oceanic or atmospheric conditions for which SA algorithms are simply unpractical?